verifying facilities availability, writing the work order, and preparing the special bill generated as a result of construction. The Engineering Work Order captures work performed exclusively by personnel in the Facilities Management Center.

Q. How do you respond to criticisms that the Engineering Work Order would recover costs already recovered through other rate elements?

A. The detailed work activities identified for each of the engineering rate elements clearly demonstrate that the costs associated with the Engineering Work Order have not been captured in either the manual Loop Qualification charge or the Engineering Query charge. In other proceedings, CLECs have alleged that the Engineering Work Order covers a variety of administrative tasks related to conditioning such as (1) verifying the availability of facilities; (2) writing the work order; (3) preparing the bill; and (4) updating records. The CLECs' claims are erroneous for the following reasons:

(1) Verizon VA must verify that facilities are *still* available when the CLEC places the final order.

(2) Tasks associated with writing the final work order are not completed until notification from the CLEC that it will move ahead with the conditioning charges, and this effort is clearly not contained in any other rate element.

(3) Work associated with preparing a bill is included only when a firm order is issued for the conditioning work and not contained in any other rate element.

(4) Updating records to reflect the removal of load coils or bridged taps on plats will not occur until after a firm commitment is received from the CLEC ordering loop conditioning.

The results of the NRC study for the Engineering Work Order can be found in VZ-VA CS, Vol. XI, Part H, Section H, Page 2, Line 67.

iii) Cooperative Testing

Q. What is Cooperative Testing?

A. A CLEC may request Cooperative Testing of an ADSL-compatible loop by the Verizon Installation and Maintenance (I&M) technician, working together with the CLEC. This involves the following activities. First, the Verizon VA technician calls the CLEC, using the CLEC-provided toll free telephone number. This telephone call is originated from the end user's premises. Upon reaching the CLEC, the Verizon VA technician notifies the CLEC of the circuit identification and the location of the demarcation point. At the CLEC's direction, the Verizon VA technician first provides a "short" across the pair. The Verizon VA technician then removes the short across the pair so the CLEC can perform its diagnostic tests. Finally, the Verizon VA technician tests for a "tone" on the loop transmitted by the CLEC in

order to complete the test. If the cooperative test is successful, the CLEC will approve the loop.

Q. What if the loop does not pass the Cooperative Test?

A. If the loop does not pass, the CLEC will give Verizon the specific trouble data to assist the field technician in correcting an identified problem in the loop. The Verizon field technician will bridge on the Regional CLEC Coordination Center and the Central Office technician to help isolate the trouble. The CO Frame technician will assist in the determination of whether the trouble is in the Verizon facilities or the CLEC's network. In addition, the CO Frame technician will ensure wiring is correct and will perform the appropriate tests (*e.g.*, short, open, etc.) under the direction of the field technician.

Q. What is the next step in the Cooperative Testing process?

A. If the trouble is found to be in Verizon VA's facilities, the Verizon field technician and/or CO Frame technician will perform the necessary repairs and resume the testing procedure with the CLEC. If the trouble proves to be in the CLEC's network, it is the CLEC's responsibility to resolve the problem.

Q. What is the final step in the Cooperative Testing process?

A. When the loop is accepted by the CLEC, the Verizon field technician will provide the completion information to the RCCC and update the job status information residing in the Computer Access Terminal (CAT). In addition, the CO Frame technician is responsible for closing out the order in the Switch/Frame Operations Management System (FOMS). Results of the xDSL Cooperative Testing Cost Study can be found in VZ-VA CS, Vol. XI, Part H, Section H, Page 2, Line 76.

Q. How are CLECs charged for Cooperative Testing?

A. CLECs who request such testing will pay the non-recurring Cooperative Testing charge.

d) Line Sharing

Q. What is line sharing?

A. Line sharing generally describes the ability of a CLEC to provide xDSL-based service over the same physical loop facility as is used by the ILEC for the provision of a retail voice grade service. As part of this arrangement, voice traffic is transported in the 0-4 kHz frequency range; data traffic is transported in the available spectrum above 4 kHz.

This frequency separation is accomplished through the use of central office-based "splitters" with low-pass and high-pass filters to combine the separate voice and data services onto a single loop facility. Splitters or filters

are also required at the customer location to separate these services for delivery to the appropriate customer provided equipment (CPE) (*i.e.*, a telephone set for voice services and a personal computer for data services). The Commission has addressed line sharing requirements in some detail.[30] The FCC Order requires an ILEC to provide a requesting carrier with access to the high frequency portion of the loop only if the ILEC provides voice services on the loop over which the CLEC seeks to provide data services.

Q. What costs associated with line sharing did the Commission conclude that the ILEC could potentially incur in providing access to line sharing?

A. The *Line Sharing Order* addressed five types of direct costs that an ILEC could potentially incur to provide access to line sharing: (1) local loops, (2) OSS, (3) cross-connects, (4) splitters, and (5) line conditioning.

Q. What costs for the local loop did the *Line Sharing Order* address?

A. The *Line Sharing Order* concluded that the states may require ILECs to charge no more to CLECs for access to shared local loops than the amount of loop costs allocated by the ILEC to its ADSL interstate retail rates.

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[30] Third Report and Order in CC Docket No. 98-147; Fourth Report and Order in CC Docket No. 96-98, *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, 14 FCC Rcd 20,912 (1999) ("*Line Sharing Order*").

Q. Does Verizon VA propose to allocate any loop costs to the rates it sets forth for line sharing?

A. No, not at this time.

Q. What costs for OSS did the *Line Sharing Order* address?

A. The Commission concluded that the incumbent LECs should recover in their line sharing charges the "reasonable incremental costs of OSS modification that are caused by the obligation to provide line sharing."[31]

Q. Does Verizon propose to charge for OSS costs associated with line sharing?

A. Yes.

Q. What OSS costs are associated with line sharing?

A. The OSS costs include the amortization of one-time expenses in connection with the required Telcordia-provided OSS software for line sharing (and its associated installation and testing), which was necessary to enhance Verizon VA's inventory systems to recognize line sharing.

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[31] *Line Sharing Order* at 20977 ¶ 144.

Q. Are there other OSS-related costs associated with line sharing?

A. Yes, the costs associated with the deployment of the Wideband Testing operating support system.

Q. How does Verizon VA propose to recover the costs for Telcordia-provided OSS software?

A. Verizon VA proposes a per-line recurring rate that will be charged to each line sharing line ordered by a CLEC. Some of the Telcordia-provided software also supports subloop unbundling applications, as described in the subloop section of this testimony. The cost study for line sharing OSS-related costs can be found in VZ-VA CS, Vol. IV, Part B-17, Section 2.1.

Q. What OSS costs have been identified?

A. Telcordia (formerly known as BellCore) was engaged by Verizon to enhance its provisioning and inventory systems to recognize the particular requirements for the line sharing, line splitting, and subloop service offerings for CLECs. OSS costs incorporated in Verizon VA's study include Telcordia costs to enhance the LFACS and the Service Order Analysis and Control (SOAC) software and the costs associated with Telecom Group Systems (TGS) or Information Systems for expansion and enhancement of the pre-ordering, ordering, and billing systems. These enhancements were required

for the systems to recognize that line sharing and line splitting arrangements involve more than one service provider. In addition, enhancements were made to the Loop Engineering Information System (LEIS), the LEAD system, the Network and Services Data Base (NSDB), and the Provisioning Analyst Workstation.

Q. What are the enhancements that Telcordia is providing to Verizon's provisioning and inventory systems in order to permit line sharing?

A. The overall enhancement is referred to as Loop Through: Subloop Unbundling, and its two major components are Constrained Loop Assignment and Enhanced Partial Reuse. These enhancements are designed to allow the provisioning of unbundled loop service orders to flow through LFACS and SOAC systems and to promote the reuse of in-place facilities when existing service is changed either to a line sharing arrangement or to an unbundled subloop arrangement.

Q. What enhancements to Verizon VA's OSS will Loop Through: Subloop Unbundling provide?

A. The Loop Through method is a provisioning process applicable to facility changes for customers who are changing to subloop unbundled service. This method reduces the coordination required between the ILEC and the CLEC by allowing activities involving CLEC outside plant facilities to be

performed at a different time from the work involving ILEC facilities. This was accomplished through the development and deployment of enhanced versions of Telcordia licensed software.

Q. How does Constrained Loop Assignment enhance Verizon VA's OSS?

A. Constrained Loop Assignment means that Verizon is constrained in the assignment of cable and pair between its SAI and the CLEC's Telecommunications Outside Plant Interconnection Cabinet (TOPIC) to the cable and pair designated by the CLEC. The Telcordia enhancement will permit the provisioning of unbundled loop service orders in LFACS to flow through mechanically using pre-specified cable and pair CLEC/ILEC meet points and other CLEC-provided information. Telcordia is also providing enhancements to the SOAC-licensed software to send information relevant to the constrained loop assignment to LFACS based on service order input.

Q. What enhancement to Verizon VA's OSS does Enhanced Partial Reuse provide?

A. Partial Reuse refers to the reuse of only a portion of the loop. Enhanced Partial Reuse changes the LFACS design for reuse processing. The existing design would discard an entire loop design if a change in a working circuit caused even part of the working loop to become incompatible with a new service request. This would lead to reassignment of the entire working loop

and might result in disrupting the end user's service. The OSS enhancement promotes the reuse of in-place distribution facilities wherever possible when existing service is changed to either a line sharing arrangement or an unbundled subloop arrangement.

Q. Please explain the Wideband Test System you mentioned in connection with OSS costs.

A. Verizon VA is purchasing and deploying a Wideband Test System. This equipment and associated operational support will allow Verizon VA to minimize its forward-looking costs for trouble shooting on shared loops. The test capability ensures that the loop is capable of supporting the desired services from the customer end user to the DSLAM and isolates any problems to either the data or the voice layer. This enhanced capability is designed to reduce the costs Verizon VA (and the CLEC) incurs in connection with technician dispatches to investigate trouble reports — costs that otherwise would only increase as the volume of this type of service arrangement increases. Verizon VA uses the Hekimian testing system, which provides remote testing and spectrum testing capabilities. The Hekimian wideband testing equipment provides the following information: POTS supervision, central office Noise, Loop Noise, Dial Tone, Loop Wiring, xDSL Signal, and ATU-R Detection. This information will be provided to CLECs upon request.

Q. Why is Wideband Testing necessary?

A. It is necessary to ensure that Verizon can meet high wholesale service standards and do so in a manner that is most cost-efficient for CLECs ordering such service. The testing system allows Verizon to avoid or minimize the costly exercise of dispatching service technicians to central offices and customer locations to check trouble reports, which may result from a variety of circumstances having nothing to do with the loop itself. Wideband testing can isolate trouble to the data or voice layer of the loop so that Verizon can resolve problems in the loop prior to circuit turn-up, thereby reducing the number of technician dispatches and simultaneously minimizing levels of inadequate order completions.

Q. Since some CLECs may perform their own testing, why is it necessary for Verizon VA also to conduct wideband testing?

A. First, not all CLECs do perform their own tests, and thus the system is essential. Even where CLECs do perform their own testing, Verizon VA must still do its own testing. Verizon VA does not have access to CLEC test results and thus has no way to know what those results demonstrate. Nor can Verizon VA know if the CLEC test is accurate. Without reliable test results, Verizon would have no choice but to dispatch a technician to try to isolate every reported trouble, which would be a misuse of limited technician

resources and highly inefficient. The Wideband Test System reduces such inefficiencies.

Q. Please explain the Wideband Test System Charge.

A. Verizon proposes to charge a monthly recurring Wideband Testing Charge.[32] The cost is developed by starting with the vendor cost and adding the costs of engineering, furnishing, and installation through the application of an EF&I factor. This results in a total in-place cost. This in-place cost is used to develop a monthly cost per line through the application of network, common overhead, and gross revenue loading factors spread over the expected number of lines used for xDSL-compatible loops, line sharing, and line splitting.

Q. What costs associated with cross-connects did the *Line Sharing Order* address?

A. The *Line Sharing Order* found that where the splitter is located within the incumbent LEC's main distribution frame, the cost for installing cross-

[32] Verizon initially labeled this "Wideband Test Access," simply because the manufacturer referred to one of its major components as a Metallic Test Access Unit. Verizon's use of the term "Access" was not intended to imply that the Wideband Test System would in any way be included in the access to its OSS. CLECs will, however, have ready access to the results of the tests.

connects for xDSL services would, in general, be the same as the costs incurred for cross-connecting loops to the CLEC's collocation facilities.

Q. Does Verizon VA propose to apply cross-connect charges for line sharing arrangements?

A. Yes. The cross-connect charges would apply as a non-recurring charge when performed. Line sharing requires the disconnection of an existing cross-connect on the MDF and the establishment of two new cross-connects. As the *Line Sharing Order* directs, the Verizon VA costs for these cross-connections are the same as the central office wiring cost of a two-wire initial loop ($35.10) for the first cross-connect and the same as a two-wire additional loop central office wiring charge ($19.87) for the second. The relevant cost study results can be found in the NRC study and in VZ-VA CS, Vol. XI, Part H, Section H, Lines 1 and 2, Column D, or Line 123, Column D.

Q. What different provisioning scenarios did Verizon VA assume in developing splitter costs?

A. Verizon VA assumed two different scenarios, which are included in its proposed interconnection agreement, for the splitter installation costs to capture the different manners in which the splitter could be located, installed, maintained, and supported. Option C calls for the CLEC to purchase the

splitter and for either Verizon VA or a Verizon VA-approved vendor to install it in Verizon VA's CO space and maintain and support it. Option A allows the CLEC to purchase and install the splitter in its collocation cage, with Verizon VA providing administrative and support functions within its network.[33]

Q. Please describe Option C and how the costs were developed for that option.

A. Under Option C, the CLEC purchases the splitter and transfers the asset to Verizon VA for a nominal amount. Verizon VA or a Verizon VA-approved vendor installs the splitter and Verizon VA assumes responsibility for network maintenance, administration, and support.

Q. What costs has Verizon VA identified for line sharing associated with the splitter in Option C?

A. Verizon VA's studies identify the following splitter cost elements: (1) splitter installation, (2) splitter administration support, and (3) splitter

[33] Verizon VA's proposed interconnection agreement refers to Options 1 and 2, which are identical to Options A and C, respectively. This testimony refers to Options A and C to remain consistent with references in Verizon VA's cost studies.

equipment support (see VZ-VA CS, Vol. IV, Part B-15 and Part B-16). These cost studies assume the placement of the SIECOR Relay Rack Mounted Splitter on a rack located in Verizon VA's own space in the CO. The rack contains circuit cards, each containing four splitters. The splitter shelf has a capacity for 24 cards (96 splitter capacity).

The first cost element is the non-recurring installation cost if Verizon VA installs the splitter on behalf of the CLEC. The CLEC has the option of arranging for the installation of the splitter in a Verizon VA central office through the use of an approved installation vendor. If the CLEC requests that Verizon VA install the splitter, a one-time installation cost is applied. The second cost element applied to splitters installed in a Verizon VA central office is a recurring cost element to recover the network maintenance and support costs for the splitter. The third cost element is the recovery of the collocation-related costs for the splitter equipment support element. The cost studies for these elements can be found in the VZ-VA CS, Vol. IV, Part B-15 and B-16.

Q. How were the splitter installation costs developed?

A. The relevant cost study (see VZ-VA CS, Vol. IV, Part B-15) calculates the installation cost for the splitter common equipment shelf and the full complement of 24 splitter cards by multiplying the material cost by an EF&I factor. In this manner Verizon develops the installed cost similarly to the

way it would derive the installed cost of any investment in a specific class of plant.

Q. Why is it appropriate to use an EF&I factor approach to estimate the cost to install splitters?

A. While there are many ways to identify the cost to install equipment, one question that must be answered before an approach is selected is whether a single average tariff rate is to be established or whether the customer will pay the costs incurred on an installation-specific basis.

The use of an installation-specific basis would simply lead to the establishment of an Individual Case Basis or Time and Material charging approach. This approach presents a set of unique challenges that have normally restricted its application to a small and limited number of service offerings. For most products and service offerings, a single tariff rate, based on an estimate of the average cost, has been employed. Likewise, for the cost to install splitters, an average cost approach is being used.

There is so much equipment in the network that Verizon VA could not possibly measure the specific installation costs of each and every piece of existing or new equipment. It is most efficient to determine the average cost and apply that across all equipment. This approach generally has been accepted in regulatory filings across the nation for years, it is auditable, and it can be tested for reasonableness against a component of the cost for which

third party information is available. This approach calls for the application of an EF&I factor to the material price of the splitter. The EF&I factor identifies costs associated with vendor engineering, Verizon VA engineering, transportation, warehousing, vendor installation, Verizon VA installation, and acceptance testing, all of which may be incurred when installing splitters. For splitters, the EF&I factor that is used is the one associated with the Digital Circuit Equipment (Subscriber Pair Gain – equipment at central office) account, Field Reporting Code 257, which is the account to which the splitters were assigned by Accounting Classifications under Part 32 of the Commission's rules.

Q. In other jurisdictions, opposing parties have argued that because of the base year used for the development of the EF&I factor, there is no splitter-related investment in the denominator of the factor; therefore, the factor would overstate EF&I expenses. Would you please respond to this claim?

A. First, the EF&I factor simply presents a relation of the EF&I expense of a year divided by the plant additions for the same period. Consequently, it is the relationship of the expenses and investments that existed at such time that make the factor relevant. In any event, the absence of the expenses of installing splitters from the EF&I numerator given the base year likely has a far greater effect on the EF&I factor than the absence of the splitter material

costs from the denominator. The material costs are relatively low compared to the installation costs, and thus absence of the latter results in understatement of the factor, certainly not overstatement.

Q. Would you please describe how you tested the reasonableness of the amount of EF&I expense identified using the factor?

A. Two installation vendors, Teletech and Orius, were asked to provide Verizon VA with quotes for installing a splitter shelf and a full component of splitter cards. The quotes were $1,164 and $1,044 from Teletech and Orius, respectively, solely for the vendor's portion of the installation effort. In addition to this expense item, Verizon VA would incur its own engineering- and installation-related costs. For example, Verizon VA would perform space planning, site survey, central office walk-through with the vendor before and after installation, acceptance testing, and administrative effort to ensure all databases were updated with splitter information. Particularly given that the vendor estimates do not cover any of the myriad Verizon engineering, installation, testing or other expenses, Verizon VA's identification of $1,482 for the full installation of a splitter, based on an EF&I factor applied to the splitter material cost, is reasonable.

Q. How were the splitter administrative and support costs developed under Option C?

A. The splitter administrative and support cost is also developed in VZ-VA CS, Vol. IV, Part B-15, by applying the ACFs (*i.e.*, Network, Other Support, and Wholesale Marketing) to the total installed investment (material plus installation). In this case, even though the splitter investment is made by the CLEC and not Verizon VA, the investment still operates as a reasonable base for the estimation of related costs; as explained above, these ACFs are designed to estimate a relationship between forward-looking expense and forward-looking investment, which should remain relevant regardless of who has made the investment.

Q. Please describe Option A and how the costs were developed for that option.

A. If the splitter is installed in the CLEC collocation cage, the CLEC purchases and installs the splitter. In this scenario, the cost of maintaining that splitter and supporting it in Verizon's network is borne by the CLEC. Therefore, Verizon has excluded maintenance, repair, and testing costs from the recurring cost and recovers only the cost incurred for administration and other support. That cost is developed in VZ-VA CS, Vol. IV, Part B-15.

Q. What costs associated with conditioning did the *Line Sharing Order* address?

A. The *Line Sharing Order* found that the states may require that the conditioning charges for shared lines not exceed the charges the LECs are permitted to recover for similar conditioning of stand-alone loops for xDSL services. The costs associated with qualification and conditioning are included in the testimony section dealing with xDSL non-recurring costs; these costs are less likely to occur in a line sharing scenario. The same costs (see VZ-VA CS, Vol. XI, Part H, Section H) for removal of bridged taps are applied to line sharing if requested by the CLEC.

Q. Does Verizon include loop conditioning costs for the removal of load coils in connection with charges for line sharing?

A. No. By definition, a shared loop must be capable of being used for both voice and data services. When load coils are present, it is generally because they are necessary for effective transmission in the voice frequency range. However, they inhibit satisfactory data transmission. To the extent that the removal of load coils is required to make a loop xDSL-compatible, that removal would make the loop unsuitable for voice transmission and, therefore, not eligible for line sharing. Conditioning costs for load coil removal apply only if such removal is requested by the CLEC.

Q. Does Verizon include loop conditioning costs for the removal of bridged taps in connection with charges for line sharing?

A. It should be relatively uncommon to find bridged taps at a level sufficient to significantly impair the quality of xDSL transmission.[34] If there are bridged taps greater than 6,000 feet on facilities requested for line sharing they will be removed at no cost to the CLEC. If the length of bridged taps is less than 6,000 feet and the CLEC requests that they be removed, the CLEC will be charged for their removal.

Q. Does Verizon VA propose specific costs for line splitting over and above those for line sharing?

A. No, not at this time. Verizon VA has not yet studied the costs that would arise from special OSS that would be needed or from work activities specific to the provisioning of line splitting. In addition, as Verizon VA gains actual experience with the service, it may learn that extra coordination between the carriers is required to test, turn up, and maintain this service compared to other services, because there are three carriers involved rather than two.

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[34] In the 254 loop samples collected in New York for a 1997 Bellcore study, there were no loops where the bridged tap exceeded 6,000 feet, and only 18 instances where an individual bridged tap exceeded 2,000 feet. In fact, for the entire sample, the average maximum bridged tap length for the loops that did have a bridged tap was 840 feet, and the average total of all the bridged taps on a loop was 1,038 feet. The same study included 262 loops in the former Bell Atlantic South region, and determined that the average total bridged tap length in that sample was 1,269 feet.

Verizon reserves the right to file a cost study for the recovery of any such additional costs at a future time.

e) ISDN Extension Electronics

Q. Please explain the ISDN loop Extension Electronics process.

A. Verizon VA's existing wholesale rate for ISDN-BRI-compatible loops is limited to loops 18,000 feet or less in length. When a CLEC orders an ISDN-BRI-compatible loop and the metallic loop length is greater than 18,000 feet, additional electronics must be added to the loop.

Verizon VA is proposing a non-recurring cost to recover the cost of the necessary electronics investment in those instances, plus the labor costs associated with its installation. The cost of the investment is Verizon VA's actual, current purchase price for the electronics, inclusive of all applicable discounts, and with all appropriate loadings. The cost of the extension electronics was *not* included in the UNE rate development for the ISDN-BRI-compatible loop.

Q. How was the cost for ISDN-BRI-compatible loop electronics developed?

A. The cost study recognizes that the ISDN Extension Electronics are essentially investments, which Verizon VA proposes to recover through a one-time non-recurring charge. Thus, the central office electronics material investments are converted to in-place or installed investments through the application of

the appropriate investment loading factors (EF&I, Power, and L&B). The outside plant electronics material investments are converted to in-place or installed investments by determining the time required to install the remote terminal electronics (estimated to be a half hour), and multiplying this time by the directly assigned labor rate for the outside plant technician. For a more complete description of the methodology employed for determining non-recurring costs, please see the cost study for the addition of ISDN electronics in VZ-VA CS, Vol. IV, Part B-13.

Q. Why should these investment costs be recovered through a non-recurring as opposed to a recurring charge?

A. The proposal to introduce a non-recurring charge for ISDN Loop Electronics addresses the fact that there is likely to be considerable customer churn in the market for advanced data services. In such circumstances, the recovery period built into the development of recurring cost studies may lead to significant under-recovery of these costs. In addition, the application of a non-recurring cost on the cost causer is a more equitable recovery mechanism than the spreading of the cost over all ISDN-BRI-compatible loops.

Q. Is this proposed charge based on forward-looking costs in view of the fact that extension equipment would not be required for two-wire loops provisioned using DLC technology?

A. Yes. In practice, ISDN loop extension is only requested for loops that are, in fact, provisioned on copper rather than DLC. As explained below in the non-recurring costs section of the testimony, because Verizon will in fact provide ISDN loop extension using the copper facilities in the future, it is entirely forward-looking to recover the non-recurring costs of doing so.

Q. Does this conclude your testimony regarding recurring and non-recurring costs associated with xDSL-compatible loops, line sharing, and ISDN loop Extension Electronics?

A. Yes.

3. DS3 High Capacity Loops

Q. Please describe the DS3 high capacity loop UNE.

A. A DS3 high capacity loop is a digital local access service that connects a customer's premises to a Verizon VA central office at the DS3 signaling rates (44.7 Mbps). Because of their high capacity, DS3 loops are typically ordered by large business customers in urban areas.

Q. What facilities are used to provide DS3 loops?

A. DS3 loops require the following types of facilities: (1) central office electronic equipment, including a multiplexer, digital cross-connect frames, and fiber termination frames; (2) equipment installed at the customer's

premises, such as a multiplexer, a protective cabinet housing the multiplexer, power equipment, cross-connect panels, and fiber termination frames; and (3) fiber cable and associated "structure" investment to connect the customer's premises to the serving central office.

Q. How did Verizon VA determine the relevant investments associated with DS3 high capacity loops?

A. As with the loop cost study, material prices for electronic equipment reflect the latest negotiated contract prices provided to Verizon VA by the manufacturers. The electronics material prices were multiplied by the circuit equipment EF&I, L&B, and Power investment loading factors to arrive at a total installed investment. Fiber cable investments including installation and engineering costs were obtained from the VRUC database as described in the two-wire and four-wire loop section of this testimony.

Q. How was the structure investment determined?

A. Structure investment was determined using the same methodology as previously described in the two-wire and four-wire loop section of this testimony.

Q. What recurring cost components were identified for the DS3 high capacity loop?